

2015
-16

Multani Mal Modi College, Patiala

Unit Planning B.Sc. Honours[Mathematics]



UNIT PLAN

Class-B.Sc. Honours in Mathematics (Sem-I)

Subject- BMH101:Calculus-I

TILL MST-I
Differential Calculus: $\epsilon - \delta$ definition of the limit of a function. Basic properties of limits. Continuous functions and classification of discontinuities. Differentiability. Applications of Derivatives. Asymptotes. Test for concavity. Points of inflexion. Tracing of Curves. Integral Calculus: Integration of functions. Riemann sum and definite integrals. Properties, Area and the Mean value theorem, The fundamental theorem of Calculus. Integral Calculus : Integration by parts, Partial fractions and trigonometric substitutions. Applications of integrals. Areas between curves. Finding volumes by slicing. Volumes of solids of Revolution-Disks and Washers.
TILL MST-II
Cylindrical Shells. Lengths of plane curves. Areas of surfaces of revolution. Infinite Series :Limits of sequence of numbers. Theorems for calculating limits of sequences, Infinite Series. Bounded and Monotonic sequences, Cauchy's convergence criterion. Series of non-negative terms. Comparison tests. Cauchy's Integral test. Ratio tests. Alternating series. Absolute and conditional convergence. Leibnitz Theorem,
TILL FINAL EXAM
Convergence of Taylor Series, Error Estimates. Applications of Power Series.

Mode of Assessment

Mode of Assessment		
Sr. No.	Component	Weightage
1	Mid Semester Test (MST)	40% (Average of 2 MST)
2	Written Assignments	40%
3	Attendance	20%

MULTANI MAL MODI COLLEGE, PATIALA

UNIT PLAN

Class –B.Sc. Honours in Mathematics (Sem-I)

Subject: BHM 102: Coordinate Geometry

TILLMST-I

Transformation of axes in two dimensions: shifting of origin, rotation of axes, the second degree equation $S=ax^2+2hxy+by^2+2gx+2fy+c=0$, its invariants t , and O . Reduction of the second degree equation into standard form. Identification of curves represented by $S=0$ (including pair of lines). Pair of Straight lines: Joint equation of pair of straight lines and angle between them, condition of parallelism and perpendicularity, joint equation of the angle bisectors, joint equation of lines joining origin to the intersection of a line and a curve.

Circle: General equation of circle, circle through intersection of two lines, Tangents and Normals, Chord of contact, pole and polar, pair of tangents from a point, equation of chord in terms of midpoint, angle of intersection and orthogonality, power of a point w.r.t circle, radical axis, coaxial family of circles, limiting points.

Conic: General equation of conic, Tangents, normals, chord of contact, pole and polar, of tangents from a point, equation of chord in terms of midpoint, diameter. Conjugate diameters of ellipse and hyperbola, special properties of parabola, ellipse and hyperbola, conjugate hyperbola, asymptotes of hyperbola, rectangular hyperbola.

Transformation of axes in two dimensions: shifting of origin, rotation of axes, the second degree equation $S=ax^2+2hxy+by^2+2gx+2fy+c=0$, its invariants t , and O . Reduction of the second degree equation into standard form. Identification of curves represented by $S=0$ (including pair of lines).

TILLMST-II

Polar coordinates: Polar equations of straight lines, circles and conics. Polar equation of chords, tangents normals only.

Review of lines and planes in 3-dimension, change of axes, shift of origin, rotation of axes, sphere, section of a sphere by a plane. Sphere through a given circle. Intersection of a line and sphere, tangent line, tangent plane, angle of intersection of two spheres and condition of orthogonality, power of a point w.r.t a sphere, Radical planes, radical axis, radical centre, coaxial family of spheres, limiting points, Cylinder, Cone with vertex at origin as the graph of homogeneous equation of second degree in x,y,z , cone as a surface generated by a line passing through fixed curve and a fixed point outside the plane of the curve, reciprocal cones

TILLFINAL EXAM

right circular and elliptic cones, right circular cone as a surface of revolution obtained by rotating the curve in a plane about an axis, enveloping cones, ellipsoid, equations of hyperboloids, paraboloids in the standard form, tangent planes and normals.

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UNIT PLAN
Class – B.Sc. (HONS. SCHOOL IN MATHEMATICS)
1st SEMESTER

CS- 103: Introduction to Information Technology

Max Marks: 75

Maximum Time: 3 Hrs.

TILL MST-I
<ul style="list-style-type: none">Historical Evolution of Computer: Characterization of Computers, types of Computers, the Computer generations. Basic Anatomy of Computers: memory unit, input-output unit, arithmetic logic unit, control unit, central processing unit, RAM, ROM, PROM, EPROM. Input-Output Devices: punched hole devices, magnetic media devices, printers, keyboard, scanners, OCR, OMR. Number System: non-positional and positional number systems, base conversion, fractional numbers, various operations on binary numbers: addition, subtraction, multiplication and division. Secondary Storage: sequential vs random storage, floppy, hard disk, optical disk.
TILL MST-II
<ul style="list-style-type: none">Computer Code: BCD, EBCDIC, ASCII, Grey Code Computer Software: Introduction, types of software: application and systems software. Computer Languages: Machine Language, assembly language, high level language, 4GL, assembler, compiler and interpreter. Networking: Basics, types of networks (LAN, WAN, MAN), topologies, communication media, Operating System, Definition, functions and types of operating system,
TILL FINAL EXAM
<ul style="list-style-type: none">E-commerce: meaning, advantages and application of e-commerce..

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UNIT PLAN

Class – B.Sc. (HONS. SCHOOL IN MATHEMATICS)

1st SEMESTER

CS-104 A: Computer Programming using 'C'

Max Marks: 75

Maximum Time: 3 Hrs.

TILL MST-I

- Programming process: Problem definition, program design, coding, compilation and debugging.
- Identifiers and keywords, data types, input and output, type conversion, operators and expressions: Arithmetic, unary, logical and relational operators, assignment operator, conditional operator, library functions.
- Control statements: branching, looping, using for, while and do-while statements, nested control structures, switch, break and continue statement.
- Functions: definition, call prototype and passing arguments to a function, recursion versus iteration. User defined and library functions. Storage classes: automatic, external and static variables.

TILL MST-II

- Arrays: Definition, accessing elements, initialization, passing to functions, multi dimensional arrays, strings,
- Structure: variables, accessing members, nested structures.
- Pointers: address and differencing operators, declaration, assignment, passing pointer to functions, pointer arrays, pointer and arrays, pointer to structures

TILL FINAL EXAM

- Files: reading, writing text and binary files. text vs binary files.

Mode of Assessment

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UNIT PLAN

Class – B.Sc. Honours in Mathematics (Sem-I)

Subject: SC 105: Mathematical Foundation of Statistic

TILL MST-I
Notion of Probability: Random experiment, sample space, axiom of probability, elementary properties of probability, equally likely outcome problems. Random Variables : Concept, cumulative distributive function, discrete and continuous random variables, expectations, mean, variance, moment generating functions. Discrete random variable: Bernoulli random variable, binomial random variable, generic random variable, Poisson random variable. Continuous random variables: Uniform random variable, exponential random variable, Gamma random variable, normal random variable.
TILL MST-II
Conditional probability and conditional expectations, Bayes theorem, independence, computing expectation by conditioning; some applications- a list model, a random graph, Paly's urn model. Bivariate random variable: Joint distributions and conditional distributions, the correlation coefficient. Function of random variable: Sum of random variables. The laws of large numbers and the Central Limit Theorem, the approximation of distributions.
TILL FINAL EXAM
Uncertainty, information and entropy, conditional entropy, solution of certain logical problems by calculating information

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MULTANI MAL MODI COLLEGE, PATIALA
UNIT PLAN
Class – B.Sc. Honours in Mathematics (Sem-I)
Subject: PBI 106: Punjabi

TILL MST-I

(ੳ) ਪੰਜਾਬੀ ਸਾਹਿਤ
(ਕਵਿਤਾ)

1. ਵਿੱਦਿਆ ਵੀਚਾਈ (ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਜੀ)
2. ਇਸ਼ਕ ਦੀ ਨਾਵਿਓਂ ਨਵੀਂ ਬਹਾਰ (ਬੁੱਲੇ ਸ਼ਾਹ)
3. ਹੀਰ (ਵਾਰਿਸ ਸ਼ਾਹ)
4. ਜੰਗਨਾਮਾ (ਸ਼ਾਹ ਮੁਹੰਮਦ)
5. ਵੈਰੀ ਨਾਗ ਦਾ ਪਹਿਲਾ ਝਲਕਾ (ਭਾਈ ਵੀਰ ਸਿੰਘ)

(ਕਹਾਣੀ)

1. ਪੇਸ਼ੀ ਦੇ ਨਿਆਣੇ (ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ)
- (ਨਾਟਕ)

1. ਮਾਂ ਦਾ ਡਿਪਟੀ (ਈਸ਼ਵਰ ਚੰਦਰ ਨੰਦਾ)

(ਅ) ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਅਤੇ ਲੋਕਧਾਰਾ

- i. ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਮੁਢਲੀ ਜਾਣਕਾਰੀ (ਡਾ. ਜਸਵਿੰਦਰ ਸਿੰਘ)
- ii. ਲੋਕ ਧਾਰਾ ਅਤੇ ਸਾਹਿਤ : ਸ.ਸ. ਵਣਜਾਰਾ ਬੇਦੀ

(ੲ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿੱਪੀ

- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਬਣਤਰ : ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ

TILL MST-II

(ੳ) ਪੰਜਾਬੀ ਸਾਹਿਤ
(ਕਵਿਤਾ)

1. ਮੇਲੇ ਵਿੱਚ ਜੱਟ (ਧਨੀ ਰਾਮ ਚਾਤ੍ਰਕ)
2. ਹਾਲ ਵਾਹੁਣ ਵਾਲੇ (ਪ੍ਰੋ. ਪੂਰਨ ਸਿੰਘ)
3. ਤਾਜ ਮਹੱਲ (ਮੋਹਨ ਸਿੰਘ)
4. ਅੱਜ ਆਖਾਂ ਵਾਰਿਸ ਸ਼ਾਹ ਨੂੰ (ਅਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ)
5. ਕਚ-ਸੂਤਕ (ਹਰਿਭਜਨ ਸਿੰਘ)

(ਕਹਾਣੀ)

1. ਰੁਲਫੀ (ਸੁਜਾਨ ਸਿੰਘ)

(ਅ) ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਅਤੇ ਲੋਕਧਾਰਾ

- i. ਤੀਆਂ (ਗਿਆਨੀ ਗੁਰਦਿੱਤ ਸਿੰਘ)

(ੲ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿੱਪੀ

- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਇਤਿਹਾਸ : ਡਾ. ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ

ਤੀਜਾ ਯੂਨਿਟ :

TILL FINAL EXAM

(ੳ) ਪੰਜਾਬੀ ਸਾਹਿਤ

(ਕਵਿਤਾ)

- ਗਜ਼ਲ (ਜਗਤਾਰ)
- ਗੀਤ (ਸ਼ਿਵ ਕੁਮਾਰ ਬਟਾਲਵੀ)
- ਗਜ਼ਲ (ਸੁਰਜੀਤ ਪਾਤਰ)
- ਅਸੀਂ ਲੜਾਂਗੇ ਸਾਥੀ (ਪਾਸ ਉਰਫ ਅਵਤਾਰ ਸਿੰਘ ਸੰਧੂ)
(ਕਹਾਣੀ)
- ਖੱਬਲ (ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ)

(ਅ) ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਅਤੇ ਲੇਕਧਾਰਾ

- ਉਹ ਕਵੀਸਰ ਜੋ ਹੁਣ ਨਹੀਂ ਮਿਲਦੇ : ਸ. ਸੂਬਾ ਸਿੰਘ

(ੲ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿੱਪੀ

‘ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਬਣਤਰ’ ਅਤੇ ‘ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਇਤਿਹਾਸ’ ਦੋਵਾਂ ਅਧਿਆਇਆਂ ਦੀ ਦੁਹਰਾਈ

(ਸ) ਸਮੁੱਚੇ ਸਿਲੇਬਸ ਦੀ ਦੁਹਰਾਈ/ਅਭਿਆਸ

Mode of Assessment

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1	Mid Semester Test (MST)	40% (Average of 2 MST)
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UNIT PLAN

Class – B.Sc. Honours in Mathematics (Sem-II)

Subject:BMH- 201: Calculus-II

TILL MST-I
Vector Analysis : Vectors in the plane Cartesian Co-ordinates and vectors in spaces. Dot and cross products. Lines and planes in space, Cylinders and Quadric surfaces. Cylindrical and Spherical co-ordinates Vector valued functions and space curves. Modelling Projectile Motion. Arc length and Unit Tangent vector curvature, Torsion and the TNB Frame. Line and Surface integrals.
TILLMST-II
Multivariable Functions:Functions of several variables. Limits and continuity. Partial derivatives. Differentiability. The chain rule, Directional derivatives, Gradient vectors and tangent planes. Extreme values and saddle points. Lagrange multipliers
TILLFINAL EXAM
Double integrals. Double integrals in Polar Form. Triple integrals in Rectangular co-ordinates. Triple integrals in Cylindrical and Spherical co-ordinates.

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UNIT PLAN

Class – B.Sc. Honours in Mathematics (Sem-II)

Subject: BMH- 202: Ordinary Differential Equations

TILL MST-I
<p>Ordinary differential equations: Basic definitions: order and degree of differential equation, primitives, solutions of differential equations, Integral curves, isoclines. First order differential equations: Linear, non-linear differential equations, Variables separable, homogeneous, non-homogeneous exact equations and integration factors, equations reducible to first order, Clairaut's equation and Geometrical interpretation of first order differential equation, applications. Successive approximations, Lipschitz condition, Statements of Existence and Uniqueness of solution of first order differential equations.</p>
TILL MST-II
<p>Second order Differential Equations: Linear equations with constant coefficients. Standard Methods for solution, Nonhomogeneous, linear with constant coefficients. Method of Variation of Parameter, Linear Independence, Linear dependence, Wronskian. Second order linear equation with variable coefficient.</p>
TILL FINAL EXAM
<p>Euler equation, regular singular points, ordinary points, series solution. Method of Frobenius, Applications, Legendre's, Hermite's and Bessel's equation.</p>

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3	Attendance	20%

UNIT PLAN
Class – B.Sc. (HONS. SCHOOL IN MATHEMATICS)
2nd SEMESTER

CS-203: Computer Systems Architecture

Max Marks: 75

Maximum Time: 3 Hrs.

TILL MST-I

- Basic computer architecture, functional organization, Register organization, arithmetic and logic unit, central processing unit, Instruction formats, Addressing modes, Data transfer and manipulation, Interrupts, RISC/CISC architecture.
- Boolean algebra, Basic Gates,
- Combinational logic design: half-adder, full adder, parallel adder.
- Sequential circuits: concept, flip-flops (D, RS, JK, JK-Master-Slave, T), Counters (Ripple, Asynchronous Synchronous, Decade, Mod-5).

TILL MST-II

- Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit, Memory organization: memory hierarchy, Memory types: cache, associative and other types. I/O organization: Peripheral devices, I/O interface

TILL FINAL EXAM

- Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA, I/O processor.

Mode of Assessment

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3	Attendance	20%

UNIT PLAN

Class – B.Sc. (HONS. SCHOOL IN MATHEMATICS)

2nd SEMESTER

CS-204 A: Object Oriented Programming with "C++"

Max Marks: 75

Maximum Time: 3 Hrs.

TILL MST-I

- Evolution of OOP: Procedure Oriented Programming, OOP Paradigm, Advantages and disadvantages of OOP over its predecessor paradigms. Characteristics of Object Oriented Programming: Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability, User defined Data Types.
- Introduction to C++: Identifier, Keywords, Constants, Operators: Arithmetic, relational, logical, conditional and assignment. Size of operator. Type conversion, Variable declaration, expressions, statements, manipulators. Input and output statements, stream I/O, Conditional and Iterative statements.
- Storage Classes: Automatic, Static, Extern, Register.
- Arrays, Arrays as Character Strings. Pointers: Pointer Operations, Pointer Arithmetic, Pointers and Arrays, Pointer to functions. Functions: Prototyping, Definition and Call, Scope Rules. Parameter Passing: by value, by address and by reference, Functions returning references, recursion, Default Arguments, Const arguments.

TILL MST-II

- Pre-processor: #define, #error, #include, #if, #else, #endif, #ifdef, #ifndef, #undef
- Classes and Objects: Class Declaration and Class Definition, Defining member functions, making functions inline, Nesting of member functions, Members access control. this pointer.
- Objects: Object as function arguments, array of objects, Const member functions. Static data members and Static member functions. Friend functions and Friend classes.
- Constructors: properties, types of constructors (Default, parameterized and copy), Dynamic constructors, multiple constructors in classes. Destructors: Properties, Virtual destructors. Destroying objects. Rules for constructors and destructors. Array of objects. Dynamic memory allocation using new and delete operators, Nested and container classes. Scopes: Local, Global

TILL FINAL EXAM

- Inheritance: Defining derived classes, inheriting private members, single inheritance, types of derivation, constructors in derived class.
- Polymorphism : Operator overloading and Function overloading.

Mode of Assessment

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3	Attendance	20%
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UNIT PLAN

Class – B.Sc. Honours in Mathematics (Sem-II)

Subject:SC-205: LINEAR PROGRAMMING

TILL MST-I
Mathematical Programming Problems, Linear programming problems (LPPs);Examples, Mathematical formulation, Graphical solution, Solution bySimplex method, Artificial variables, Big-M method and Two phase method.Duality in linear programming; Concept, Mathematical formulation, fundamental properties of duality, duality and simplex method and dual simplex method.
TILL MST-II
Sensitivity Analysis : Discrete changes in the cost vector, requirement vector and Co-efficient matrix (Numerical Problems Only). Transportation problem ; initial basic feasible solution and Optimal solutions using MODI method (for balanced cases only)
TILL FINAL EXAM
Assignment problem; Formulation of Assignment Problems, solution of balanced and unbalanced assignment problems, maximization case in assignment problem.

Mode of Assessment

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2	Written Assignments	40%
3	Attendance	20%